3.3 Rivers and Streams Recreational Designated Use Assessment

All waters in New Jersey are designated for primary contact recreation (i.e., swimming) and secondary contact recreation (e.g., wading, boating). In order to protect human health, fecal coliform bacteria criteria were established in New Jersey Surface Water Quality Standards (SWQS). SWQS are described in Section 3.1.1 of this report. Fecal coliform bacteria levels in water provide an indication of pollution from human or animal fecal material, which may contain organisms that are harmful to human health.

Some of New Jersey's rivers and streams, particularly those in the Pinelands, are used for swimming and secondary contact recreational activities, such as canoeing. Other rivers are not accessible or safe for these activities (e.g., steep banks, rapids, private property). Water quality data on fecal coliform levels are collected at Ambient Stream Monitoring Network stations which are typically not located where swimming or secondary contact recreation occurs. In addition, this assessment considers sanitary quality of rivers, but does not consider recreational beach amenities or access to the stream. Thus, these data are not appropriate for assessing risks to human health associated with swimming in rivers.

As discussed in Part III, Sections 4.2 and 5.2, New Jersey's lake, bay and ocean beaches are thoroughly monitored and are very safe for swimming. Through information exchange with watershed partners, river locations used for swimming will be identified and targeted fecal coliform monitoring at these locations will be explored.

3.3.1 Rivers and Streams Recreational Designated Use Assessment Method

The surface water quality standard criteria for fecal coliform and monitoring are discussed in Section 3.1 of this report. Data collected between 1995 and 1997 were used for this assessment as shown on Table 3.3.1-1

Table 3.3.1-1: Recreational Use Assessment Method for Rivers and Streams

Full Support	The FC geometric average was less than 200 MPN/100ml and less than 10 percent of individual samples exceeded 400 MPN/100 ml.
Full Support but Threatened	FC levels meet full support but statistically significant adverse trends indicate full support will not be attained in 2 years.
Partial Support	The FC geometric average was less than 200 MPN/ 100 ml, and more than 10 percent of individual samples exceeded 400 MPN/100 ml.
No Support	The FC geometric average exceeded 200 MPN/100 ml and more than 10 percent of individual samples exceeded 400 MPN/ 100 ml.

Notes:
Adapted from: EPA Guidance for Preparation of Water Quality Inventory Reports, EPA, 1997.
Compared to New Jersey SWQS for FW2; Secondary contact uses are considered to be met if SWQS for primary contact is met.

Spatial Extent of Assessment: This assessment was based on data collected at 76 ASMN stations between 1995 and 1997. The 5 Delaware River monitoring stations were not included in this

assessment because recreational designated use is reported in the Delaware River Basin Commission's Water Quality Inventory Report. (DRBC, 2000). As discussed in Part III, Chapter 3.1, in previous New Jersey Water Quality Inventory Reports, each station was assumed to represent 5 miles of stream. For this assessment, each station was assumed to represent the stream reach that was monitored. Stream reaches have been defined by USEPA in the Reach File 3 system, which can be used on GIS. Reach File 3 (RF3) was mapped at a moderate 1:100,000 scale. Using RF3, the 76 ASMN stations represent 176 river miles. The RF3 reach identification number and reach length are provided in Table A3.1.2-1 in the Appendix. Use RF3 was considered an intermediate approach to the more refined spatial assessment that will be provided by the redesigned ASMN.

It is important to note that the monitoring design used to collect these data does not support extrapolating the assessment results to locations or streams that were not monitored. Streams that appeared to have the greatest impacts were prioritized in this network.

3.3.2 Rivers and Streams Recreational Designated Use Assessment

Between 1995 and 1997, 995 fecal coliform samples were collected in the ASMN. Geometric means at 75 stations ranged between 3.8 FC/100 ml and 2911.9 FC/100 ml. The percent of samples at individual stations exceeding 400 FC/100 ml ranged from 0% to 88.9%. As discussed below, an evaluation of trends in fecal coliform by USGS indicated that waters that currently fully support recreational uses will continue to support uses through 2002. (USGS, 1999). Results are summarized in Table 3.3.2-1 below and provided for individual stations in Table A3.3.2-1 and shown on Figure A3.3.2-1 in the Appendix.

Table 3.3.2-1: Fecal Coliform Attainment Status (1995-97)

Attainment Status	# of Stations	% of Stations	# of River Miles	% of Assessed River Miles
Full Support	16	21.3%	29.8	16.9%
Full Support but Threatened	0	0%	0	0%
Partial Support	17	22.7%	28.0	15.9%
No Support	42	56%	118.2	67.1%
Totals	75	100%	176	

Pinelands rivers, such as the Rancocas, Bass, Oswego and Mullica were fully swimmable at the monitored locations. The Great Egg Harbor River was fully swimmable at 2 locations: Sicklerville, near the headwaters and Folsom. Downstream at Weymouth, this river was partially swimmable.

It is important to note that New Jersey proactively adopted EPA's guidance as the basis for New Jersey's SWQS criteria. Adoption of this guidance into state's SWQS was encouraged but not mandated. Some states may report comparatively higher attainment of recreational designated uses than New Jersey, however, this may be a function of less stringent SWQS criteria in that

state. EPA is moving toward requiring states to adopt EPA criteria for e.coli and/ or enterococcus by 2003.

Trends between 1986 and 1995 were assessed by USGS (USGS, 1999). Statistically significant trends were identified at 12 of 75 New Jersey stations and 1 of 5 Delaware River stations. Of these, 5 locations had trends of environmental importance (i.e., change in concentration greater than 100 FC/100 ml per year). These trends are summarized on Table 3.3.2-2 below. Additional data assessments are needed to evaluate the reason(s) for improving water quality at 4 stations and worsening water quality at 1 station.

Table 3.3.2-2: Stations with Significant Trends in Fecal Coliform (1986-95)

Station #	Station Name	FC Geomean (MPN/100 ml) [1]	FC % >400 MPN/ 100 ml [1]	Trend (FC/ 100 ml per year) [2]
01393450	Elizabeth R at Ursino Lake	2508.8	85.7 %	- 4700
01464000	Assunpink at Trenton	2002.4	88.9 %	+ 870
01467069	NB Pennsauken Cr at Cherry Hill	231.6	35.7 %	- 400
01464515	Doctors Cr at Allentown	353.2	53.8 %	- 260
01398620	NB Raritan River nr Chester	106.9	14.3 %	- 210

Notes:
1. 1995-97 ASMN data
2. 1986-95 trends from USGS, 1999 (-) indicates declining concentrations and improving water quality; (+) indicates increasing concentrations and worsening water quality

3.3.3 Recreational Designated Use Source and Cause Assessment

Fecal coliform pollution causes non-attainment of recreational designated uses in rivers and streams. As stated earlier, these data are not appropriate to evaluate risks to human health from swimming in rivers and streams because monitoring stations are currently not located where swimming and secondary contact occur. Further, lake, ocean and bay bathing beaches are thoroughly monitored and very safe for swimming.

It is also important to consider the source of fecal coliform pollution. Contact with human wastes presents a significantly higher risk of illness than contact with animal wastes. Specific sources of fecal coliform pollution have not yet been identified. However, compliance with permit limits for fecal coliform at wastewater treatment plants is high and incidence of treatment plant failures are low. Thus, most fecal coliform pollution in freshwater rivers and streams is suspected to be derived from animal wastes.

Fecal coliform pollution is suspected to occur primarily from domestic pets, livestock and wild animal wastes which are transported to rivers and streams by municipal and industrial stormwater, overland runoff and by direct contact with water. Although Canada goose population data are not readily available, significant populations of these animals occur in and around many New Jersey waterways. In developed areas, domestic pet and bird wastes (e.g.,

pigeons) contribute to fecal coliform in stormwater. In agricultural areas, animal manure piles and access of livestock to streams can contribute to fecal coliform pollution.

In localized instances, fecal coliform pollution may be attributed to human wastes from combined sewer overflows, failing sanitary sewer infrastructure, failing or inappropriately located septic systems and occasionally from wastewater treatment plant failures. Compliance with permit limits for fecal coliform at New Jersey wastewater treatment plants is very high. (WCE, *Pers. Comm.*, 6/2000).

Combined sewer overflows (CSOs) are pipes that discharge combined sanitary and stormwater under wet weather conditions. The 300 CSO discharge points in New Jersey are located primarily in older cities in northeastern New Jersey and in Trenton and Camden. (See Figure A3.3.3-1 in the Appendix). Most CSOs discharge to tidal waters, except those located in Patterson. As shown in Appendix A3.3.3-1, levels of fecal coliform are higher downstream of the Patterson CSOs (i.e., at the Passaic River at Elmwood Park - station # 01389880) than upstream (i.e., Passaic River at Little Falls – station # 01389500). This assessment was conducted to support the CSO Program Memorandum of Agreement with EPA Region II. Efforts of the CSO program to manage CSO discharges are described in Part II: Water Pollution Control Programs.

3.3.4 Improving Stream Sanitary Quality

The following programs and activities are intended to improve the sanitary quality of New Jersey streams:

Evaluate Human Health Risk: Currently, fecal coliform monitoring occurs at locations that are sampled as part of the Ambient Stream Monitoring Network. Based on conversations with field sampling personnel, these locations are not widely used for swimming or boating in rivers. Through the Watershed Management process, the Department plans to identify river locations used for swimming and boating and explore cooperative monitoring at these locations. Fecal coliform data collected at locations used for swimming and boating will provide more relevant information regarding potential exposure to pathogens. Since exposure to human waste poses a greater health risk than exposure to animal waste, it may also be important to conduct additional testing to evaluate human and animal sources of pathogens, for example using bacteriopahge assays.

TMDL Development: Stream reaches with exceedences of fecal coliform have been identified on the 1998 Impaired Waterbodies List. Waterbodies remain on the Impaired Waterbodies List until new data show compliance with SWQS. Pollution control measures for point and nonpoint sources, including TMDLs, must be developed for waterbodies on the 1998 Impaired Waterbodies List in accordance with the schedule in the TMDL Memorandum of Agreement (MOA) (See Part II, Appendix A2.5-2).

Source Identification: As TMDLs are developed, sources of fecal pollution will be identified. Sanitary surveys to identify failing or inappropriately placed septic systems, cross-connections

and interconnections between sanitary and storm sewer infrastructure, livestock waste, pets and wildlife, etc. Sanitary surveys were successfully used in the Whippany River watershed to identify an area affected by failing septic systems.

Sanitary surveys have been a significant component of source identification in New Jersey's coastal waters to protect shellfish beds and bathing beaches. A discussion of source identification in Seaside Heights is provided in Part III, Chapter 7 as an example.

Source Management: Municipal Stormwater Planning and Permitting programs are implemented, connections between sanitary and storm sewers will be corrected. NJDEP is working with the New Jersey Department of Agriculture to identify and map confined animal feeding operations to ensure proper management of these facilities. Through Watershed Management and TMDL development, geese management strategies, pet waste ordinances, and storm sewer maintenance, septic system maintenance, siting and as appropriate, removal will be explored and implemented on a watershed specific basis. The Environmental Infrastructure Trust's State Revolving Fund and Nonpoint Source Grants can provide low interest loans and grants to address sanitary water quality problems. These programs and recent projects are described in Part II: Water Pollution Control Programs.